LISTING OF CLAIMS

1-4. (canceled).

5. (previously presented) A biosensor, comprising a resonant optical cavity with a circular cross section and a substantially planar, circular end surface, the resonant optical cavity also having a quality factor of at least about 10^4.

6. (previously presented) A biosensor, comprising a resonant optical cavity having a quality factor of at least about 10^7.

7. (canceled).

8. (canceled).

9. (currently amended) ~~A~~ The biosensor of claim 5, ~~comprising~~ wherein the resonant optical cavity is part of an array of resonant optical cavities~~, at least one resonant optical cavity of said array being cylindrical in shape, having a diameter of about 10 μm to about 100 μm, and having a substantially planar end surface~~.

10. (previously presented) The biosensor of claim 5, further comprising a transmission port adjacent a surface of said at least one resonant optical cavity and configured to transmit electromagnetic radiation into said at least one resonant optical cavity.

11. (previously presented) A biosensor comprising a resonant cavity having a transmission port adjacent a surface of said resonant optical cavity and configured to transmit electromagnetic radiation into said resonant optical cavity wherein said transmission port comprises a waveguide distribution network configured to transmit electromagnetic radiation into a plurality of resonant optical cavities, said waveguide distribution network including at least one of a bus network and a combination tree-buss network.

12. (previously presented) The biosensor of claim 5, further comprising at least one capture substrate immobilized on or adjacent to a surface of said resonant optical cavity.

13. (original) The biosensor of claim 12, comprising a plurality of types of capture substrates immobilized on or adjacent to said surface.

14. (previously presented) The biosensor of claim 13, wherein said plurality of types of capture substrates are immobilized on or adjacent to different regions of said surface.

15. (original) The biosensor of claim 12, further comprising a sensor configured to detect binding of said at least one capture substrate with analyte or a molecule that competes with said analyte.

16. (previously presented) The biosensor of claim 12, further comprising a sensor for detecting at least one mass and fluorescence.

17. (previously presented) A biosensor, comprising a resonant optical cavity, said resonant optical cavity being a doubly resonant.

18. (previously presented) A biosensor, comprising a resonant optical cavity, said resonant optical cavity being capable of generating whispering gallery modes and comprising at lease one of a microfabricated resonant optical cavity and a bulk resonant optical cavity, and further comprising:

a source of electromagnetic radiation;

a transmission port in communication with said source and disposed adjacent a surface of said resonant optical cavity so as to transmit electromagnetic radiation into said resonant optical cavity;

at least one capture substrate immobilized on or adjacent to a substantially defect free surface of said resonant optical cavity; and

a sensor configured to detect at least one of a mass of molecules immobilized relative to said surface and fluorescence from molecules immobilized relative to said surface.

19. (previously presented) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity having a quality factor of at least about 10^4 so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate.

20. (previously presented) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

applying to at least one of a fluorescently labeled analyte and a fluorescently labeled molecule that competes with the at least one analyte for a binding site on said at least one capture substrate to said surface;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate.

21. (original) The method of claim 20, wherein said detecting comprises detecting excitation of fluorescent tags by employing at least one of one-photon absorption and two-photon absorption.

22. (previously presented) A method for detecting at least one analyte in a sample comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, further comprising photo-recycling said electromagnetic radiation by double resonance of sand resonant optical cavity.

23. (previously presented) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, wherein said detecting comprises mass sensing.

24. (original) The method of claim 23, wherein said mass sensing comprises measuring a refractive index through cavity detuning.

25. (previously presented) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, wherein said detecting is effected with a concentration of the at least one analyte being at least one of nanomolar or lower and picomolor or lower.

26. (original) A method for fabricating a resonant optical cavity, comprising:

providing a substrate;

fabricating a contrasting layer on said substrate; and

forming a resonant optical cavity over said contrasting layer, said resonant optical cavity having a refractive index of at least about 1.5 times a refractive index of said contrasting layer.

27. (original) The method of claim 26, wherein said providing said substrate comprises providing at least one of glass, quartz, and a semiconductive material.

28. (original) The method of claim 26, wherein said forming said resonant optical cavity comprises;

forming a material layer comprising at least one of silicon oxide and silicon oxynitride over said contrasting layer; and

patterning said material layer to form at least one cylindrical resonant optical cavity therefrom.

29. (canceled).

30. (canceled).